

SEQUENCE LISTING

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<120> THE GENE CLUSTER INVOLVED IN SAFRACIN BIOSYNTHESIS AND
ITS USES FOR GENETIC ENGINEERING

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<150> PCT/GB03/005563
<151> 2003-12-19

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<151> 2002-12-20

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<170> PatentIn Ver. 3.3

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<211> 1004

<212> PRT

<213> *Pseudomonas fluorescens* A2-2

<400> 2

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Gln Leu Val Ser Arg Ile Glu Arg Val Val Glu Arg His Ala Ser Leu
 20             25            30

Arg Gln Arg Phe Val Met Arg Asn Gly Thr Tyr Trp Ile Glu Gln Ala
 35             40            45

Pro Pro Gln Gln Arg Arg Tyr Cys Val Val Arg Thr Tyr Asp Glu Ala
 50             55            60

Ser Thr Asp Ala Leu Leu Ala Pro Ser Arg Glu His Ile Gly Val Glu
 65             70            75            80

Ser Glu Arg Leu Phe Arg Ala Glu Val Val Glu Arg Ser Asp Gly Gln
 85             90            95

Arg Tyr Leu Val Phe Arg Ile His His Ile Ile Ala Asp Leu Trp Ser
100            105           110

Val Gly Leu Leu Ile Arg Asp Phe Ala Glu Asp Cys Met Asp Arg Ser
115            120           125

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Ser Ile Thr Leu Ala Ser Arg Pro Ile Ala Pro Leu Ile Asp Pro Glu
 130 135 140
 Phe Trp Arg His Gln Met Ser Gln Asp Thr Pro Phe Ser Leu Pro Met
 145 150 155 160
 Ala Ser Leu Glu Gln His Thr Asp Arg Arg Met Val Leu Ser Ser Phe
 165 170 175
 Val Ile Asp Gln Glu Ser Ser Ala Asp Leu Ala Arg Leu Ala Thr Ala
 180 185 190
 Cys Ala Val Thr Pro Tyr Thr Val Met Leu Ala Ala Gln Val Leu Ala
 195 200 205
 Leu Ser Arg Ile Gly Gln Ser Gly Arg Leu Ser Leu Ala Val Thr Phe
 210 215 220
 His Gly Arg Asn Arg Gly Asn Lys Asp Ala Val Gly Tyr Phe Ala Asn
 225 230 235 240
 Thr Leu Ala Val Pro Phe Asp Val Ser Glu Cys Ser Val Gly Glu Phe
 245 250 255
 Val Lys Arg Thr Ala Lys Arg Leu Asp Glu Ala Ser Lys Ala Ser Val
 260 265 270
 Gly Ala Gly Tyr Pro Glu Leu Ala Glu Phe Met Thr Pro Leu Gly Trp
 275 280 285
 Ala Ala Thr Ala Pro Thr Asn Ala Val Ile Tyr Gln Gln Asp Met Pro
 290 295 300
 Gly Met Pro Arg Gly Leu Ala Ala Ala Leu Leu Gly Leu Gly Thr Val
 305 310 315 320
 Gln Leu Gly Glu Met Ala Leu Thr Ala Glu Gln Ala Pro Pro Ser Ile
 325 330 335
 Gly Pro Phe Ala Thr Ala Leu Leu Leu Thr Arg His Asp Gly Lys Leu
 340 345 350
 His Gly Arg Val Glu Val Asp Pro Ala Gln His Pro Gly Trp Leu Ala
 355 360 365
 Glu Ala Leu Ala Arg Gln Phe Ala Val Ile Leu Arg Glu Met Val Arg
 370 375 380
 Asp Pro Gln Ala Arg Leu Ser Ala Leu Pro Ala Cys Leu Leu His Gln
 385 390 395 400
 Pro Lys Tyr Pro Ser Gln Ala Arg Pro Ala Pro Ala Ser Glu Thr Leu
 405 410 415
 Val Ala Thr Phe Leu Arg Gln Val Ala Ile Thr Pro Asp Lys Pro Ala
 420 425 430

Leu Arg Thr Pro Gln Ala Ser Ile Ser Tyr Ser Glu Leu Ala Ser Arg
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 Val Ala Arg Leu Ser Ala Ala Leu Arg Val Arg Gly Phe Lys Pro Glu
 450 455 460
 Gln Thr Leu Ala Ile Leu Leu Pro Arg Asp Ile Asn Leu Val Pro Ala
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 Arg Ala Ile Leu Thr Asp Gln Glu Gly Leu Thr Arg Phe Ala His Leu
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 Ala Pro Cys Trp Ser Leu Ser Asp Leu Leu Ser Met Pro Asp Ala Pro
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 545 550 555 560
 Ser Gly Ser Thr Gly Glu Pro Lys Gly Val Ala Ile Thr His Ala Asn
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 595 600 605
 Phe Glu Met Phe Ala Pro Leu Met Val Gly Gly Cys Val Gln Pro Val
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 Ser Ser Val Met Ala Leu Ile Asp Asn Pro Ala Leu Leu Lys Gly Thr
 625 630 635 640
 Thr Leu Ile Asn Thr Val Pro Ser Val Ala Asp Ala Leu Leu Gln His
 645 650 655
 Asp Val Leu Val Pro Ser Leu Arg Met Leu Asn Leu Ala Gly Glu Pro
 660 665 670
 Leu Asn Arg Asp Leu Tyr Leu Arg Leu Gln Ala Lys Leu Thr Ala Thr
 675 680 685
 Arg Ile Val Asn Leu Tyr Gly Pro Thr Glu Thr Thr Tyr Ser Thr
 690 695 700
 Ala Leu Val Ile Glu Pro Ala Gln Gln Glu Ile Thr Ile Gly Phe Pro
 705 710 715 720
 Leu Tyr Gly Thr Trp Val Asp Val Val Asp Gln Asn Met Gln Ser Val
 725 730 735

Gly Ile Gly Val Pro Gly Glu Leu Ile Ile His Gly His Gly Val Ala
 740 745 750
 Gln Gly Tyr Val Ser Asp Pro Val Arg Ser Ala Ala Ser Phe Leu Pro
 755 760 765
 Ala Ser Asp Gly Leu Arg Cys Tyr Arg Thr Gly Asp Arg Val Arg Trp
 770 775 780
 Leu Pro Asp Gly Arg Leu Asp Phe Ile Gly Arg Glu Asp Asp Gln Val
 785 790 795 800
 Lys Val Arg Gly Phe Arg Val Glu Leu Gly Pro Val Gln Ala Ala Leu
 805 810 815
 His Ala Ile Glu Thr Ile His Glu Ser Ala Val Val Val Val Pro Lys
 820 825 830
 Gly Gln Gln Arg Ser Ile Val Ala Phe Ile Val Leu Lys Ala Pro Ser
 835 840 845
 Glu Asp Glu Ala Val Gln Arg Asn Asn Ile Lys Gln His Leu Leu Gly
 850 855 860
 Val Leu Pro Tyr Tyr Ala Leu Pro Asp Lys Phe Ile Phe Val Lys Ala
 865 870 875 880
 Leu Pro Arg Asn Thr His Gly Lys Ile Asp Arg Thr Leu Leu Leu Gln
 885 890 895
 His Glu Pro Gln Thr Glu Gln Glu Ser Ala Met Arg Asp Ala Thr Asp
 900 905 910
 Val Glu His Arg Ile Ala Asn Cys Trp Gln Thr Ile Ile Gly His Pro
 915 920 925
 Val Gln Leu His Glu Asn Phe Leu Asp Ile Gly Gly His Ser Leu Ser
 930 935 940
 Leu Thr His Leu Thr Gly Leu Leu Arg Lys Glu Phe Asn Ile His Ile
 945 950 955 960
 Ser Leu His Asp Leu Trp Ile Arg Pro Thr Ile Glu Gln Gln Ala Asp
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<210> 3

<211> 1062

<212> PRT

<213> Pseudomonas fluorescens A2-2

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Ala	Tyr	Thr 35	Leu	Ala	Met	Lys	Val 40	Ser	Ile	Ala	Gly	Lys 45	Leu	Asn	Thr
Leu	Arg 50	Leu	Gln	Arg	Ala	Val 55	Asn	Gln	Val	Val	Ala 60	Ser	Gln	Glu	Ile
Leu 65	Arg	Thr	Ser	Phe 70	Ala	Tyr	Lys	Asn	Gln	Lys 75	Leu	Ser	Gln	Val	Ile 80
Ser	Pro	Ser	Ala	Thr 85	Leu	Pro	Ile	Arg	Ser 90	Ala	His	Cys	Ile	Asp 95	Asp
Val	Pro	Gly	Leu 100	Gln	Arg	Leu	Ile	Asn 105	Met	Glu	Ala	Gln	Arg 110	Gly	Trp
Ser	Leu 115	Ser	Ser	Ala	Pro	Leu	Tyr 120	Arg	Leu	Leu	Leu	Ile 125	Lys	Thr	Gly
Asp 130	Gln	Gln	His	Glu	Leu	Val 135	Ile	Cys	Thr	His	His 140	Ile	Val	Cys	Asp
Gly 145	Ile	Ser	Leu	Gln 150	Leu	Leu	Leu	Gln	Lys	Ile 155	Val	Ser	Ala	Tyr	Gln 160
Gly	Gln	Ser	Asp	Gly 165	Arg	Val	Leu	Thr	Ser 170	Pro	Asp	Glu	Glu	Thr 175	Leu
Gln	Phe	Val	Asp 180	Tyr	Ala	Ala	Trp	Ser 185	Arg	Gln	His	Glu	Tyr 190	Ala	Gly
Leu	Glu	Tyr 195	Trp	Arg	Gln	Gln	Leu 200	Ala	Asp	Ala	Pro	Thr 205	Ile	Leu	Asp
Ile 210	Ser	Thr	Lys	Thr	Gly	Arg 215	Ser	Glu	Gln	Gln	Thr 220	Phe	Leu	Gly	Ala
Arg 225	Ile	Pro	Val	Glu	Phe 230	Ser	His	His	Gln	Trp 235	Gln	Ala	Leu	Arg	Gln 240
Ile	Phe	Arg	Pro	Gln 245	Gly	Ile	Ser	Cys	Ala 250	Ala	Val	Phe	Leu	Ala 255	Ala
Tyr	Cys	Val 260	Val	Leu	His	Arg	Leu	Ala 265	Glu	Gln	Asp	Asp	Ile 270	Leu	Ile
Gly	Leu	Pro 275	Thr	Ser	Asn	Arg	Leu 280	Arg	Pro	Glu	Leu	Ala 285	Gln	Val	Ile
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 370 375 380
 Leu Phe Leu Phe Glu Asp Glu Leu Asn Val Cys Gly Phe Leu Glu Tyr
 385 390 395 400
 Ala Thr Asp Arg Ile Asp Ala Ala Ser Ala Gln Asn Met Val Arg Met
 405 410 415
 Leu Ser Ser Val Leu Arg Glu Phe Val Ala Ala Pro Gln Ala Pro Leu
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 Ser Glu Val Gln Leu Gly Ala Ala Asp Ser Gln Ala Gln Thr Pro Ala
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 Asp Ser His Pro Asn Ala Thr Ala Leu Arg Asp Glu Gln Gly Glu Leu
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 Thr Tyr Ala Gln Val Cys Gln Gln Ile Leu Gln Ala Ala Ala Thr Leu
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 Arg Gly Asn Pro Trp Leu Ile Ala Met Leu Ala Ile Trp Gln Val Gly
 515 520 525
 Gly Ile Tyr Val Pro Leu Ser Lys Asp Leu Pro Glu Gln Arg Leu Gln
 530 535 540
 Gly Ile Leu Ala Glu Leu Glu Gly Ala Ile Leu Ile Thr Asp Asp Thr
 545 550 555 560
 Thr Pro Glu Arg Phe Arg Gln Arg Val Thr Leu Pro Met His Ala Leu
 565 570 575
 Trp Ala Asp Gly Ala Thr His His Glu Arg Gln Thr Thr Asp Ala Ser
 580 585 590
 Arg Leu Ser Gly Tyr Met Met Tyr Thr Ser Gly Ser Thr Gly Lys Pro
 595 600 605

Lys	Gly	Val	His	Val	Ser	Gln	Ala	Asn	Leu	Val	Ala	Thr	Leu	Ser	Ala	610	615	620	
Phe	Gly	Gln	Leu	Leu	Gln	Val	Lys	Pro	Ser	Asp	Arg	Met	Leu	Ala	Leu	625	630	635	640
Thr	Thr	Phe	Ser	Phe	Asp	Ile	Ser	Leu	Leu	Glu	Leu	Leu	Leu	Pro	Leu	645	650	655	
Val	Gln	Gly	Ala	Ser	Val	Gln	Ile	Ala	Val	Ala	Gln	Ala	Gln	Arg	Asp	660	665	670	
Ala	Glu	Lys	Leu	Ala	Gly	Tyr	Leu	Ala	Asp	Pro	Arg	Ile	Thr	Leu	Val	675	680	685	
Gln	Ala	Thr	Pro	Val	Thr	Trp	Arg	Leu	Leu	Leu	Ser	Thr	Gly	Trp	Gln	690	695	700	
Pro	Arg	Glu	Ser	Leu	Thr	Leu	Leu	Cys	Gly	Gly	Glu	Ala	Leu	Pro	Gln	705	710	715	720
Asp	Leu	Ala	Asp	Arg	Leu	Cys	Leu	Pro	Gly	Met	Thr	Leu	Trp	Asn	Leu	725	730	735	
Tyr	Gly	Pro	Thr	Glu	Thr	Thr	Ile	Trp	Ser	Thr	Ala	Cys	Arg	Leu	Gln	740	745	750	
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Ala	Leu	Val	Asp	Arg	Asn	Leu	Arg	Ser	Val	Pro	Arg	Gly	Val	Ile	Gly	770	775	780	
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Pro	Val	Glu	Thr	Ala	Lys	Arg	Phe	Val	Pro	Asp	Pro	His	Gly	Ser	Gly	805	810	815	
Lys	Arg	Ala	Tyr	Leu	Thr	Gly	Asp	Arg	Met	Arg	Met	Gln	Gln	Asp	Gly	820	825	830	
Ser	Leu	Ala	Tyr	Ile	Gly	Arg	Arg	Asp	Asp	Gln	Ile	Lys	Leu	Arg	Gly	835	840	845	
His	Arg	Ile	Glu	Leu	Gly	Glu	Ile	Glu	Thr	Ala	Leu	Arg	Lys	Leu	Pro	850	855	860	
Gly	Val	Arg	Asp	Ala	Ala	Ala	Gln	Leu	His	Asp	Gln	Asp	Pro	Ser	Arg	865	870	875	880
Gly	Ile	Gln	Ala	Phe	Val	Gln	Leu	Cys	Ala	Thr	Val	Asp	Glu	Ser	Leu	885	890	895	
Ile	Asp	Ile	Gly	Gln	Trp	Leu	Glu	Thr	Leu	Arg	Gln	Thr	Leu	Pro	Glu	900	905	910	

Ala Trp Leu Pro Thr Glu Tyr Tyr Arg Ile Asp Gly Ile Pro Leu Thr
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Tyr Asn Gly Lys Arg Asp Arg Lys Arg Leu Leu His Gln Ala Val Arg
930 935 940

Leu Gln Thr Leu Ser Leu Arg Val Ala Pro Ser Ser Asp Thr Glu Thr
945 950 955 960

Arg Val Gln Gln Ile Trp Cys Glu Leu Leu Gly Leu Glu Asp Ile Gly
965 970 975

Val Thr Asp Asp Phe Phe Gln Leu Gly Gly His Ser Ile Leu Val Ala
980 985 990

Arg Met Val Glu Arg Ile Glu Thr Ala Phe Gly Arg Arg Val Pro Ile
995 1000 1005

Ala Asp Ile Tyr Phe Ser Pro Thr Ile Ala Arg Val Ala Ala Thr Leu
1010 1015 1020

Asp Ser Met Thr Phe Glu Gln Gly Leu Ala Ala His Ser Val Lys Gly
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Asp Trp Glu Phe Thr Ala Ile Ser Leu Gln His Asn Ala Asp Ser Thr
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Ala Ala Ala Gln Glu Arg
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<211> 1432

<212> PRT

<213> Pseudomonas fluorescens A2-2

<400> 4

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Lys Arg Leu Trp Leu Leu Ala Gln Leu Ala Gly Thr Ala Thr Leu Pro
35 40 45

Val Thr Val Arg Tyr Ala Phe Thr Gly Thr Val Asp Leu Ala Val Val
50 55 60

Gln Gln Asn Leu Ser Ala Trp Ile Ala His Ser Glu Ser Leu Arg Ser
65 70 75 80

Leu Phe Val Glu Val Leu Glu Arg Pro Val Arg Leu Leu Met Pro Thr
85 90 95

Gly Leu Val Lys Leu Glu Tyr Phe Asp Arg Pro Pro Ser Asp Ala Asp
100 105 110

Met	Ala	Glu	Leu	Ile	Gly	Ala	Ala	Phe	Glu	Leu	Asp	Lys	Gly	Pro	Leu	115	120	125
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Leu	Val	Gly	His	Pro	Ile	Val	Val	Asp	Glu	Pro	Ser	Leu	Gln	Arg	Ile	145	150	155
Ala	Gln	Thr	Leu	Phe	Gln	Thr	Glu	Pro	Asp	His	Gln	Tyr	Pro	Ala	Val	165	170	175
Gly	Ala	Ile	Ala	Glu	Val	Phe	Gln	Arg	Glu	Gln	Thr	Leu	Ala	Gln	Asp	180	185	190
Ala	Gln	Ile	Thr	Glu	Gln	Trp	Gln	Gln	Trp	Gly	Ile	Gly	Leu	Gln	Ala	195	200	205
Pro	Ala	Ala	Thr	Glu	Ile	Pro	Thr	Glu	Asn	Pro	Arg	Pro	Ala	Ile	Lys	210	215	220
Gly	Ser	Asp	Arg	Gln	Val	His	Glu	Ala	Leu	Thr	Ala	Trp	Gly	Asp	Gln	225	230	235
Pro	Val	Ala	Glu	Ala	Glu	Ile	Val	Ser	Ser	Trp	Leu	Thr	Val	Leu	Met	245	250	255
Arg	Trp	Gln	Gly	Ser	Gln	Ser	Ala	Leu	Cys	Ala	Ile	Lys	Val	Arg	Asp	260	265	270
Lys	Ala	His	Ala	Asn	Leu	Ile	Gly	Pro	Leu	Gln	Thr	Tyr	Leu	Pro	Val	275	280	285
Arg	Val	Asp	Met	Pro	Asp	Gly	Ser	Thr	Leu	Ala	Gln	Leu	Arg	Leu	Gln	290	295	300
Val	Glu	Glu	Gln	Leu	Asn	Gly	Asn	Asp	His	Pro	Ser	Phe	Ser	Thr	Leu	305	310	315
Leu	Glu	Val	Cys	Pro	Pro	Lys	Arg	Asp	Leu	Ser	Arg	Thr	Pro	Tyr	Phe	325	330	335
Gln	Thr	Gly	Leu	Gln	Phe	Ile	Ala	His	Asp	Val	Glu	Gln	Arg	Asp	Phe	340	345	350
His	Ala	Gly	Asn	Leu	Thr	Arg	Leu	Pro	Thr	Lys	Gln	Pro	Ser	Ser	Asp	355	360	365
Leu	Asp	Leu	Phe	Ile	Ser	Cys	Trp	Val	Ser	Asp	Gly	Thr	Leu	Gly	Leu	370	375	380
Thr	Leu	Asp	Tyr	Asp	Cys	Ala	Val	Leu	Asn	Ser	Ser	Gln	Val	Glu	Val	385	390	395
Leu	Ala	Gln	Ala	Leu	Ile	Ser	Val	Leu	Ser	Ala	Pro	Gly	Glu	Gln	Pro	405	410	415

Ile	Ala	Thr	Val	Ala	Leu	Met	Gly	Gln	Gln	Met	Gln	Gln	Thr	Val	Leu	420	425	430	
Ala	Gln	Ala	His	Gly	Pro	Arg	Thr	Thr	Pro	Pro	Gln	Leu	Thr	Leu	Thr	435	440	445	
Glu	Trp	Val	Ala	Ala	Ser	Thr	Glu	Lys	Ser	Pro	Leu	Ala	Val	Ala	Val	450	455	460	
Ile	Asp	His	Gly	Gln	Gln	Leu	Ser	Tyr	Ala	Glu	Leu	Trp	Ala	Arg	Ala	465	470	475	480
Ala	Leu	Val	Ala	Ala	Asn	Ile	Ser	Gln	His	Val	Ala	Lys	Pro	Arg	Ser	485	490	495	
Ile	Ile	Ala	Val	Ala	Leu	Pro	Arg	Ser	Ala	Glu	Phe	Ile	Ala	Ala	Leu	500	505	510	
Leu	Gly	Val	Val	Arg	Ala	Gly	His	Ala	Phe	Leu	Pro	Ile	Asp	Pro	Arg	515	520	525	
Leu	Pro	Thr	Asp	Arg	Ile	Gln	Phe	Leu	Ile	Glu	Asn	Ser	Gly	Cys	Glu	530	535	540	
Leu	Val	Ile	Thr	Ser	Asp	Gln	Gln	Ser	Val	Glu	Gly	Trp	Pro	Gln	Val	545	550	555	560
Ala	Arg	Ile	Arg	Met	Glu	Ala	Leu	Asp	Pro	Asp	Ile	Arg	Trp	Val	Ala	565	570	575	
Pro	Thr	Gly	Leu	Ser	His	Ser	Asp	Ala	Ala	Tyr	Leu	Ile	Tyr	Thr	Ser	580	585	590	
Gly	Ser	Thr	Gly	Val	Pro	Lys	Gly	Val	Val	Val	Glu	His	Arg	Gln	Val	595	600	605	
Val	Asn	Asn	Ile	Leu	Trp	Arg	Gln	Arg	Thr	Trp	Pro	Leu	Thr	Ala	Gln	610	615	620	
Asp	Asn	Val	Leu	His	Asn	His	Ser	Phe	Ser	Phe	Asp	Pro	Ser	Val	Trp	625	630	635	640
Ala	Leu	Phe	Trp	Pro	Leu	Leu	Thr	Gly	Gly	Thr	Ile	Val	Leu	Ala	Asp	645	650	655	
Val	Arg	Thr	Met	Glu	Asp	Ser	Thr	Ala	Leu	Leu	Asp	Leu	Met	Ile	Arg	660	665	670	
His	Asp	Val	Ser	Val	Leu	Gly	Gly	Val	Pro	Ser	Leu	Leu	Gly	Thr	Leu	675	680	685	
Ile	Asp	His	Pro	Phe	Ala	Asn	Asp	Cys	Arg	Ala	Val	Lys	Leu	Val	Leu	690	695	700	
Ser	Gly	Gly	Glu	Val	Leu	Asn	Pro	Glu	Leu	Ala	His	Lys	Ile	Gln	Lys	705	710	715	720

Val	Trp	Gln	Ala	Asp	Val	Ala	Asn	Leu	Tyr	Gly	Pro	Thr	Glu	Ala	Thr	725	730	735
Ile	Asp	Ala	Leu	Tyr	Phe	Ser	Ile	Asp	Lys	Asn	Ala	Ala	Gly	Ala	Ile	740	745	750
Pro	Ile	Gly	Tyr	Pro	Ile	Asp	Asn	Thr	Asp	Ala	Tyr	Ile	Val	Asp	Leu	755	760	765
Asn	Leu	Asn	Pro	Val	Pro	Pro	Gly	Val	Pro	Gly	Glu	Ile	Met	Leu	Ala	770	775	780
Gly	Gln	Asn	Leu	Ala	Arg	Gly	Tyr	Leu	Gly	Lys	Pro	Ala	Gln	Thr	Ala	785	790	795
Gln	Arg	Phe	Leu	Pro	Asn	Pro	Phe	Gly	Asn	Gly	Arg	Val	Tyr	Ala	Thr	805	810	815
Gly	Asp	Leu	Gly	Arg	Arg	Trp	Ser	Ser	Gly	Ala	Ile	Ser	Tyr	Leu	Gly	820	825	830
Arg	Arg	Asp	Gln	Gln	Val	Lys	Ile	Arg	Gly	His	Arg	Ile	Glu	Leu	Asn	835	840	845
Glu	Val	Ala	His	Leu	Leu	Cys	Gln	Ala	Leu	Glu	Leu	Lys	Glu	Ala	Ile	850	855	860
Val	Phe	Ala	Gln	His	Ala	Gly	Thr	Glu	Gln	Ala	Arg	Leu	Val	Ala	Ala	865	870	875
Ile	Glu	Gln	Gln	Pro	Gly	Leu	His	Ser	Glu	Gly	Ile	Lys	Gln	Glu	Leu	885	890	895
Leu	Arg	His	Leu	Pro	Ala	Tyr	Leu	Ile	Pro	Ser	Gln	Leu	Leu	Leu	Leu	900	905	910
Asp	Glu	Leu	Pro	Arg	Thr	Ala	Thr	Gly	Lys	Val	Asp	Met	Leu	Lys	Leu	915	920	925
Asp	Gln	Leu	Ala	Ala	Pro	Gln	Leu	Asn	Asp	Ala	Gly	Gly	Thr	Glu	Cys	930	935	940
Arg	Ala	Pro	Arg	Thr	Asp	Leu	Glu	Gln	Ser	Val	Met	Thr	Asp	Phe	Ala	945	950	955
Gln	Val	Leu	Gly	Leu	Thr	Ala	Val	Thr	Pro	Asp	Thr	Asp	Phe	Phe	Glu	965	970	975
Gln	Gly	Gly	Asn	Ser	Ile	Leu	Leu	Thr	Arg	Leu	Ala	Gly	Thr	Leu	Ser	980	985	990
Ala	Lys	Tyr	Gln	Val	Gln	Ile	Pro	Leu	His	Glu	Phe	Phe	Leu	Thr	Pro	995	1000	1005
Thr	Pro	Ala	Ala	Val	Ala	Gln	Ala	Ile	Glu	Ile	Tyr	Arg	Arg	Glu	Gly	1010	1015	1020

Leu Thr Ala Leu Leu Ser Arg Gln His Ala Gln Thr Leu Glu Gln Asp
 1025 1030 1035 1040
 Ile Tyr Leu Glu Glu His Ile Arg Pro Asp Gly Leu Pro His Ala Asn
 1045 1050 1055
 Trp Tyr Gln Pro Ser Val Val Phe Leu Thr Gly Ala Thr Gly Tyr Leu
 1060 1065 1070
 Gly Leu Tyr Leu Ile Glu Gln Leu Leu Lys Arg Thr Thr Ser Arg Val
 1075 1080 1085
 Ile Cys Leu Cys Arg Ala Lys Asp Ala Glu His Ala Lys Ala Arg Ile
 1090 1095 1100
 Leu Glu Gly Leu Lys Thr Tyr Arg Ile Asp Val Gly Ser Glu Leu His
 1105 1110 1115 1120
 Arg Val Glu Tyr Leu Thr Gly Asp Leu Ala Leu Pro His Leu Gly Leu
 1125 1130 1135
 Ser Glu His Gln Trp Gln Thr Leu Ala Glu Glu Val Asp Val Ile Tyr
 1140 1145 1150
 His Asn Gly Ala Leu Val Asn Phe Val Tyr Pro Tyr Ser Ala Leu Lys
 1155 1160 1165
 Ala Thr Asn Val Gly Gly Thr Gln Ala Ile Leu Glu Leu Ala Cys Thr
 1170 1175 1180
 Ala Arg Leu Lys Ser Val Gln Tyr Val Ser Thr Val Asp Thr Leu Leu
 1185 1190 1195 1200
 Ala Thr His Val Pro Arg Pro Phe Ile Glu Asp Asp Ala Pro Leu Arg
 1205 1210 1215
 Ser Ala Val Gly Val Pro Val Gly Tyr Thr Gly Ser Lys Trp Val Ala
 1220 1225 1230
 Glu Gly Val Ala Asn Leu Gly Leu Arg Arg Gly Ile Pro Val Ser Ile
 1235 1240 1245
 Phe Arg Pro Gly Leu Ile Leu Gly His Thr Glu Thr Gly Ala Ser Gln
 1250 1255 1260
 Ser Ile Asp Tyr Leu Leu Val Ala Leu Arg Gly Phe Leu Pro Met Gly
 1265 1270 1275 1280
 Ile Val Pro Asp Tyr Pro Arg Ile Phe Asp Ile Val Pro Val Asp Tyr
 1285 1290 1295
 Val Ala Ala Ala Ile Val His Ile Ser Met Gln Pro Gln Gly Arg Asp
 1300 1305 1310
 Lys Phe Phe His Leu Phe Asn Pro Ala Pro Val Thr Ile Arg Gln Phe
 1315 1320 1325

Cys Asp Trp Ile Arg Glu Phe Gly Tyr Glu Phe Lys Leu Val Asp Phe
1330 1335 1340

Glu His Gly Arg Gln Gln Ala Leu Ser Val Pro Pro Gly His Leu Leu
1345 1350 1355 1360

Tyr Pro Leu Val Pro Leu Ile Arg Asp Ala Asp Pro Leu Pro His Arg
1365 1370 1375

Ala Leu Asp Pro Asp Tyr Ile His Glu Val Asn Pro Ala Leu Glu Cys
1380 1385 1390

Lys Gln Thr Leu Glu Leu Leu Ala Ser Ser Asp Ile Thr Leu Ser Lys
1395 1400 1405

Thr Thr Lys Ala Tyr Ala His Thr Ile Leu Arg Tyr Leu Ile Asp Thr
1410 1415 1420

Gly Phe Met Ala Lys Pro Gly Val
1425 1430

<210> 5

<211> 350

<212> PRT

<213> Pseudomonas fluorescens A2-2

<400> 5

Met Glu Ser Ile Ala Phe Pro Ile Ala His Lys Pro Phe Ile Leu Gly
1 5 10 15

Cys Pro Glu Asn Leu Pro Ala Thr Glu Arg Ala Leu Ala Pro Ser Ala
20 25 30

Ala Met Ala Arg Gln Val Leu Glu Tyr Leu Glu Ala Cys Pro Gln Ala
35 40 45

Lys Asn Leu Glu Gln Tyr Leu Gly Thr Leu Arg Glu Val Leu Ala His
50 55 60

Leu Pro Cys Ala Ser Thr Gly Leu Met Thr Asp Asp Pro Arg Glu Asn
65 70 75 80

Gln Glu Asn Arg Asp Asn Asp Phe Ala Phe Gly Ile Glu Arg His Gln
85 90 95

Gly Asp Thr Val Thr Leu Met Val Lys Ala Thr Leu Asp Ala Ala Ile
100 105 110

Gln Thr Gly Glu Leu Val Gln Arg Ser Gly Thr Ser Leu Asp His Ser
115 120 125

Glu Trp Ser Asp Met Met Ser Val Ala Gln Val Ile Leu Gln Thr Ile
130 135 140

Ala Asp Pro Arg Val Met Pro Glu Ser Arg Leu Thr Phe Gln Ala Pro
145 150 155 160

Lys Ser Lys Val Glu Glu Asp Asp Gln Asp Pro Leu Arg Arg Trp Val
 165 170 175
 Arg Gly His Leu Leu Phe Met Val Leu Cys Gln Gly Met Ser Leu Cys
 180 185 190
 Thr Asn Leu Leu Ile Ser Ala Ala His Asp Lys Asp Leu Glu Leu Ala
 195 200 205
 Cys Ala Gln Ala Asn Arg Leu Ile Gln Leu Met Asn Ile Ser Arg Ile
 210 215 220
 Thr Leu Glu Phe Ala Thr Asp Leu Asn Ser Gln Gln Tyr Val Ser Gln
 225 230 235 240
 Ile Arg Pro Thr Leu Met Pro Ala Ile Ala Pro Pro Lys Met Ser Gly
 245 250 255
 Ile Asn Trp Arg Asp His Val Val Met Ile Arg Trp Met Arg Gln Ser
 260 265 270
 Thr Asp Ala Trp Asn Phe Ile Glu Gln Ala Tyr Pro Gln Leu Ala Glu
 275 280 285
 Arg Met Arg Thr Thr Leu Ala Gln Val Tyr Ser Ala His Arg Gly Val
 290 295 300
 Cys Glu Lys Phe Val Gly Glu Glu Asn Thr Ser Leu Leu Ala Lys Glu
 305 310 315 320
 Asn Ala Thr Asn Thr Ala Gly Gln Val Leu Glu Asn Leu Lys Lys Ser
 325 330 335
 Arg Leu Lys Tyr Leu Lys Thr Lys Gly Cys Ala Gly Ala Gly
 340 345 350

<210> 6

<211> 61

<212> PRT

<213> Pseudomonas fluorescens A2-2

<400> 6

Met Pro Thr Phe Leu Gly Asp Asp Asp Ala Val Pro Cys Val Val Val
 1 5 10 15
 Val Asn Ala Asp Lys His Tyr Ser Ile Trp Pro Ser Ala Arg Asp Ile
 20 25 30
 Pro Ser Gly Trp Ser Glu Glu Gly Phe Lys Gly Ser Arg Ser Asp Cys
 35 40 45
 Leu Glu His Ile Ala Gln Ile Trp Pro Glu Pro Thr Ala
 50 55 60

<210> 7

<211> 355

<212> PRT

<213> *Pseudomonas fluorescens* A2-2

<400> 7

Met	Thr	Ser	Thr	His	Arg	Thr	Thr	Asp	Gln	Val	Lys	Pro	Ala	Val	Leu
1				5					10					15	
Asp	Met	Pro	Gly	Leu	Ser	Gly	Ile	Leu	Phe	Gly	His	Ala	Ala	Phe	Gln
			20					25					30		
Tyr	Leu	Arg	Ala	Ser	Cys	Glu	Leu	Asp	Leu	Phe	Glu	His	Val	Arg	Asp
		35					40					45			
Leu	Arg	Glu	Ala	Thr	Lys	Glu	Ser	Ile	Ser	Ser	Arg	Leu	Lys	Leu	Gln
	50					55					60				
Glu	Arg	Ala	Ala	Asp	Ile	Leu	Leu	Leu	Gly	Ala	Thr	Ser	Leu	Gly	Met
65					70					75					80
Leu	Val	Lys	Glu	Asn	Gly	Ile	Tyr	Arg	Asn	Ala	Asp	Val	Val	Glu	Asp
				85					90					95	
Leu	Met	Ala	Thr	Asp	Asp	Trp	Gln	Arg	Phe	Lys	Asp	Thr	Val	Ala	Phe
			100					105					110		
Glu	Asn	Tyr	Ile	Val	Tyr	Glu	Gly	Gln	Leu	Asp	Phe	Thr	Glu	Ser	Leu
		115					120					125			
Gln	Lys	Asn	Thr	Asn	Val	Gly	Leu	Gln	Arg	Phe	Pro	Gly	Glu	Gly	Arg
	130					135					140				
Asp	Leu	Tyr	His	Arg	Leu	His	Gln	Asn	Pro	Lys	Leu	Glu	Asn	Val	Phe
145					150					155					160
Tyr	Arg	Tyr	Met	Arg	Ser	Trp	Ser	Glu	Leu	Ala	Asn	Gln	Asp	Leu	Val
				165					170					175	
Lys	His	Leu	Asp	Leu	Ser	Arg	Val	Lys	Lys	Leu	Leu	Asp	Ala	Gly	Gly
			180					185					190		
Gly	Asp	Ala	Val	Asn	Ala	Ile	Ala	Leu	Ala	Lys	His	Asn	Glu	Gln	Leu
		195					200					205			
Asn	Val	Thr	Val	Leu	Asp	Ile	Asp	Asn	Ser	Ile	Pro	Val	Thr	Gln	Gly
	210					215					220				
Lys	Ile	Asn	Asp	Ser	Gly	Leu	Ser	His	Arg	Val	Lys	Ala	Gln	Ala	Leu
225					230					235					240
Asp	Ile	Leu	His	Gln	Ser	Phe	Pro	Glu	Gly	Tyr	Asp	Cys	Ile	Leu	Phe
				245					250					255	
Ala	His	Gln	Leu	Val	Ile	Trp	Thr	Leu	Glu	Glu	Asn	Thr	His	Met	Leu
			260					265					270		

<400> 8																
Met	Ala	Arg	Ser	Pro	Glu	Thr	Asn	Ser	Ala	Met	Pro	Gln	Gln	Ile	Arg	
1				5					10					15		
Gln	Leu	Leu	Tyr	Ser	Gln	Leu	Ile	Ser	Gln	Ser	Ile	Gln	Thr	Phe	Cys	
			20					25					30			
Glu	Leu	Arg	Leu	Pro	Asp	Val	Leu	Gln	Ala	Ala	Gly	Gln	Pro	Thr	Ser	
		35					40					45				
Ile	Glu	Arg	Leu	Ala	Glu	Gln	Thr	His	Thr	His	Ile	Ser	Ala	Leu	Ser	
50						55					60					
Arg	Leu	Leu	Lys	Ala	Leu	Lys	Pro	Phe	Gly	Leu	Val	Lys	Glu	Thr	Asp	
65					70					75					80	
Glu	Gly	Phe	Ser	Leu	Thr	Asp	Leu	Gly	Ala	Ser	Leu	Thr	His	Asp	Ala	
				85					90					95		
Phe	Ala	Ser	Ala	Gln	Pro	Ser	Ala	Leu	Leu	Ile	Asn	Gly	Glu	Met	Gly	
			100					105					110			
Gln	Ala	Trp	Arg	Gly	Met	Ala	Gln	Thr	Ile	Arg	Thr	Gly	Glu	Ser	Ser	
		115					120					125				
Phe	Lys	Met	Tyr	Tyr	Gly	Ile	Ser	Leu	Phe	Glu	Tyr	Phe	Glu	Gln	His	
130						135					140					
Pro	Glu	Arg	Arg	Ala	Ile	Phe	Asp	Arg	Ser	Gln	Asp	Met	Gly	Leu	Asp	
145					150					155					160	
Leu	Glu	Ile	Pro	Glu	Ile	Leu	Glu	Asn	Ile	Asn	Leu	Asn	Asp	Gly	Glu	
				165					170					175		

Asn Ile Val Asp Val Gly Gly Gly Ser Gly His Leu Leu Met His Met
 180 185 190
 Leu Asp Lys Trp Pro Glu Ser Thr Gly Ile Leu Phe Asp Leu Pro Val
 195 200 205
 Ala Ala Lys Ile Ala Gln Gln His Leu His Lys Ser Gly Lys Ala Gly
 210 215 220
 Cys Phe Glu Ile Val Ala Gly Asp Phe Phe Lys Ser Leu Pro Asp Ser
 225 230 235 240
 Gly Ser Val Tyr Leu Leu Ser His Val Leu His Asp Trp Gly Asp Glu
 245 250 255
 Asp Cys Lys Ala Ile Leu Ala Thr Cys Arg Arg Ser Met Pro Asp Asn
 260 265 270
 Ala Leu Leu Val Val Val Asp Leu Val Ile Asp Gln Ser Glu Ser Ala
 275 280 285
 Gln Pro Asn Pro Thr Gly Ala Met Met Asp Leu Tyr Met Leu Ser Leu
 290 295 300
 Phe Gly Ile Ala Gly Gly Lys Glu Arg Asn Glu Asp Glu Phe Arg Thr
 305 310 315 320
 Leu Ile Glu Asn Ser Gly Phe Asn Val Lys Gln Val Lys Arg Leu Pro
 325 330 335
 Ser Gly Asn Gly Ile Ile Phe Ala Tyr Pro Lys
 340 345

<210> 9

<211> 180

<212> PRT

<213> Pseudomonas fluorescens A2-2

<400> 9

Met Ser Thr Leu Val Tyr Tyr Val Ala Ala Thr Leu Asp Gly Tyr Ile
 1 5 10 15
 Ala Thr Gln Gln His Lys Leu Asp Trp Leu Glu Asn Phe Ala Leu Gly
 20 25 30
 Asp Asp Ala Thr Ala Tyr Asp Asp Phe Tyr Gln Thr Ile Gly Ala Val
 35 40 45
 Val Met Gly Ser Gln Thr Tyr Glu Trp Ile Met Ser Asn Ala Pro Asp
 50 55 60
 Asp Trp Pro Tyr Gln Asp Val Pro Ala Phe Val Met Ser Asn Arg Asp
 65 70 75 80
 Leu Ser Ala Pro Ala Asn Leu Asp Ile Thr Phe Leu Arg Gly Asp Ala
 85 90 95

Ser Ala Ile Ala Val Arg Ala Arg Gln Ala Ala Lys Gly Lys Asn Val
 100 105 110

Trp Leu Val Gly Gly Gly Lys Thr Ala Ala Cys Phe Ala Asn Ala Gly
 115 120 125

Glu Leu Gln Gln Leu Phe Ile Thr Thr Ile Pro Thr Phe Ile Gly Thr
 130 135 140

Gly Val Pro Val Leu Pro Val Asp Arg Ala Leu Glu Val Val Leu Arg
 145 150 155 160

Glu Gln Arg Thr Leu Gln Ser Gly Ala Met Glu Cys Ile Leu Asp Val
 165 170 175

Lys Lys Ala Asp
 180

<210> 10
 <211> 220
 <212> PRT
 <213> Pseudomonas fluorescens A2-2

<400> 10
 Met Ser Asn Val Phe Ser Gly Gly Lys Gly Asn Gly Asn Pro Gly Phe
 1 5 10 15

Val Arg Thr Phe Ser Arg Ile Ala Pro Thr Tyr Glu Glu Lys Tyr Gly
 20 25 30

Thr Lys Leu Ser Gln Ala His Asp Asp Cys Leu Arg Met Leu Ser Arg
 35 40 45

Trp Met Cys Thr Ser Arg Pro Glu Arg Val Leu Asp Ile Gly Cys Gly
 50 55 60

Thr Gly Ala Leu Ile Glu Arg Met Phe Ala Leu Trp Pro Glu Ala Arg
 65 70 75 80

Phe Glu Gly Val Asp Pro Ala Gln Gly Met Val Asp Glu Ala Ala Lys
 85 90 95

Arg Arg Pro Phe Ala Ser Phe Val Lys Gly Val Ala Glu Ala Leu Pro
 100 105 110

Phe Pro Ser Gln Ser Met Asp Leu Val Val Cys Ser Met Ser Phe Gly
 115 120 125

His Trp Ala Asp Lys Ser Val Ser Leu Asn Glu Val Arg Arg Val Leu
 130 135 140

Lys Pro Gln Gly Leu Phe Cys Leu Val Glu Asn Leu Pro Ala Gly Trp
 145 150 155 160

Gly Leu Thr Thr Leu Ile Asn Trp Leu Leu Gly Ser Leu Ala Asp Tyr
 165 170 175

Arg Ser Glu His Glu Val Ile Gln Leu Ala Gln Thr Ala Gly Leu Gln
 180 185 190

Ser Met Glu Thr Ser Val Thr Asp Gln His Val Ile Val Ala Thr Phe
 195 200 205

Arg Pro Cys Cys Gly Glu Val Gly Asp His Gly Arg
 210 215 220

<210> 11

<211> 509

<212> PRT

<213> Pseudomonas fluorescens A2-2

<400> 11

Met Val Val Lys Asn Lys Gln Val Leu Val Val Gly Ala Gly Pro Val
 1 5 10 15

Gly Leu Ala Val Ala Ala Ala Leu Ala Glu Leu Gly Ile Ala Val Asp
 20 25 30

Leu Ile Asp Lys Arg Pro Ala Ala Ser Pro His Ser Arg Ala Phe Gly
 35 40 45

Leu Glu Pro Val Thr Leu Glu Leu Leu Asn Ala Trp Gly Val Ala Asp
 50 55 60

Glu Met Ile Arg Arg Gly Ile Val Trp Ala Ser Ala Pro Leu Gly Asp
 65 70 75 80

Lys Ala Gly Arg Thr Leu Ser Phe Ser Lys Leu Pro Cys Glu Tyr Pro
 85 90 95

His Met Val Ile Ile Pro Gln Ser Gln Thr Glu Ser Val Leu Thr Asp
 100 105 110

Trp Val Asn Arg Lys Gly Val Asn Leu Lys Arg Gly Tyr Ala Leu Lys
 115 120 125

Ala Leu Asp Ala Gly Asp Leu His Val Glu Val Thr Leu Glu His Ser
 130 135 140

Glu Thr Gly Ser Val Gln Gln Ser Arg Tyr Asp Trp Val Leu Gly Ala
 145 150 155 160

Asp Gly Val Asn Ser Ser Val Arg Gln Leu Leu Asn Ile Ser Phe Val
 165 170 175

Gly Gln Asp Tyr Lys His Ser Leu Val Val Ala Asp Val Val Leu Arg
 180 185 190

Asn Pro Pro Ser Pro Ala Val His Ala Arg Ser Val Ser Arg Gly Leu
 195 200 205

Val Ala Leu Phe Pro Leu Pro Asp Gly Ser Tyr Arg Val Ser Ile Glu
 210 215 220

Asp	Asn	Glu	Arg	Met	Asp	Thr	Pro	Val	Lys	Gln	Pro	Val	Thr	His	Glu	225	230	235	240
Glu	Ile	Ala	Gly	Gly	Met	Lys	Asp	Ile	Leu	Gly	Thr	Asp	Phe	Gly	Leu	245	250	255	
Ala	Gln	Val	Leu	Trp	Ser	Ala	Arg	Tyr	Arg	Ser	Gln	Gln	Arg	Leu	Ala	260	265	270	
Thr	His	Tyr	Arg	Gln	Gly	Arg	Val	Phe	Leu	Leu	Gly	Asp	Ala	Ala	His	275	280	285	
Thr	His	Val	Pro	Ala	Gly	Gly	Gln	Gly	Leu	Gln	Met	Gly	Ile	Gly	Asp	290	295	300	
Ala	Ala	Asn	Leu	Ala	Trp	Lys	Leu	Ala	Gly	Val	Ile	Gln	Ala	Thr	Leu	305	310	315	320
Pro	Met	Asp	Leu	Leu	Glu	Ser	Tyr	Glu	Ala	Glu	Arg	Arg	Pro	Ile	Ala	325	330	335	
Ala	Ala	Ala	Leu	Arg	Asn	Thr	Asp	Leu	Leu	Phe	Arg	Phe	Asn	Thr	Ala	340	345	350	
Ser	Gly	Pro	Ile	Gly	Arg	Leu	Ile	His	Trp	Ile	Gly	Leu	Gln	Ala	Thr	355	360	365	
Arg	Ala	Pro	Tyr	Val	Ala	Gln	Lys	Val	Val	Ser	Ala	Leu	Ala	Gly	Glu	370	375	380	
Gly	Val	Arg	Tyr	Asp	Ser	Val	Arg	Arg	Arg	Gly	Asp	His	Arg	Leu	Val	385	390	395	400
Gly	Arg	Arg	Leu	Pro	Leu	Leu	Ser	Leu	Leu	Pro	Glu	Gly	Glu	Arg	Leu	405	410	415	
Pro	Arg	Gln	Ser	Leu	Thr	Gln	Leu	Leu	Arg	Ala	Gly	Arg	Phe	Val	Leu	420	425	430	
Val	His	His	Arg	Ala	Lys	Ala	Leu	Ala	Ala	Asp	Leu	Arg	Arg	Asp	Phe	435	440	445	
Pro	Gly	Leu	Gln	Thr	Ala	Ser	Ile	Cys	Glu	Asp	Ser	His	Asn	Asn	Ser	450	455	460	
Leu	Ser	Ala	Gly	Glu	Gly	Val	Ile	Val	Arg	Pro	Asp	Gly	Val	Val	Ile	465	470	475	480
Trp	Val	Gly	Lys	Lys	Ser	Thr	Leu	Ala	Lys	Glu	Arg	Leu	Gly	Glu	Trp	485	490	495	
Leu	Leu	Asp	Asp	Ser	Lys	Ser	Ala	Arg	Gln	Ser	Leu	Thr				500	505		

<210> 12

<211> 348

<212> PRT

<213> *Pseudomonas fluorescens* A2-2

<400> 12

Met	Ala	His	Tyr	Asp	Ser	Val	Gly	Thr	Ala	Pro	Gly	Ala	Ser	Asp	Asp
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Gly	Met	Ala	Val	Ala	Ser	Ile	Leu	Gln	Leu	Met	Arg	Glu	Thr	Ile	Thr
			20					25					30		
Arg	Ser	Asp	Ala	Lys	Asn	Asn	Val	Val	Phe	Leu	Leu	Ala	Asp	Gly	Glu
		35					40					45			
Glu	Leu	Gly	Leu	Leu	Gly	Ala	Glu	His	Tyr	Val	Ser	Gln	Leu	Ser	Thr
	50					55					60				
Pro	Glu	Arg	Glu	Ala	Ile	Arg	Leu	Val	Leu	Asn	Phe	Glu	Ala	Arg	Gly
	65				70					75					80
Asn	Gln	Gly	Ile	Pro	Leu	Leu	Phe	Glu	Thr	Ser	Gln	Lys	Asp	Tyr	Ala
				85					90					95	
Leu	Ile	Arg	Thr	Val	Asn	Ala	Gly	Val	Arg	Asp	Ile	Ile	Ser	Phe	Ser
			100					105					110		
Phe	Thr	Pro	Leu	Ile	Tyr	Asn	Met	Leu	Gln	Asn	Asp	Thr	Asp	Phe	Thr
		115					120					125			
Val	Phe	Arg	Lys	Lys	Asn	Ile	Ala	Gly	Leu	Asn	Phe	Ala	Val	Val	Glu
	130					135					140				
Gly	Phe	Gln	His	Tyr	His	His	Met	Ser	Asp	Thr	Val	Glu	Asn	Leu	Gly
	145				150					155				160	
Pro	Glu	Thr	Leu	Phe	Arg	Tyr	Gln	Lys	Thr	Val	Arg	Glu	Val	Gly	Asn
				165					170					175	
His	Phe	Ile	Gln	Gly	Ile	Asp	Leu	Ser	Ser	Leu	Ser	Ala	Asp	Glu	Asp
			180				185						190		
Ala	Thr	Tyr	Phe	Pro	Leu	Pro	Gly	Gly	Thr	Leu	Leu	Val	Leu	Asn	Leu
		195					200					205			
Pro	Thr	Leu	Tyr	Ala	Leu	Gly	Met	Gly	Ser	Phe	Val	Leu	Cys	Gly	Leu
	210					215					220				
Trp	Ala	Gln	Arg	Cys	Arg	Thr	Arg	Arg	Gln	His	Gln	Gly	Lys	Asn	Cys
	225				230					235				240	
Val	Leu	Arg	Pro	Met	Ala	Ile	Ala	Leu	Leu	Gly	Ile	Ala	Cys	Ala	Ala
				245				250					255		
Leu	Val	Phe	Tyr	Val	Pro	Ser	Ile	Ala	Tyr	Leu	Phe	Val	Ile	Pro	Ser
			260					265					270		

Leu Leu Leu Ala Cys Ala Met Leu Ser Arg Ser Leu Phe Ile Ser Tyr
 275 280 285

Ser Ile Met Leu Leu Gly Ala Tyr Ala Cys Gly Ile Leu Tyr Ala Pro
 290 295 300

Ile Val Tyr Leu Ile Ser Ser Gly Leu Lys Met Pro Phe Ile Ala Gly
 305 310 315 320

Val Ile Ala Leu Leu Pro Leu Cys Leu Leu Ala Val Gly Leu Ala Gly
 325 330 335

Val Ile Ala Arg Ser Arg Asp Cys Arg Thr Cys Asp
 340 345

<210> 13

<211> 572

<212> PRT

<213> Pseudomonas fluorescens A2-2

<400> 13

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Thr Gln Arg Ala Trp Leu Asp Leu Arg Gln Ser Gly His Ala Pro Ser
 20 25 30

Val Val Leu Phe Thr Asp Pro Ala Leu Val Cys Gln Gln Ile Glu Asp
 35 40 45

Ser Asp Ala Asp Leu Val Ile Cys Pro Phe Leu Lys Asp Arg Val Pro
 50 55 60

Gln Gln Leu Trp Ser Asn Leu Glu Arg Pro Val Val Ile Ile His Pro
 65 70 75 80

Gly Ile Val Gly Asp Arg Gly Ala Ser Ala Leu Asp Trp Ala Ile Ser
 85 90 95

Gln Gln Val Gly Arg Trp Gly Val Thr Ala Leu Gln Ala Val Glu Glu
 100 105 110

Met Asp Ala Gly Pro Ile Trp Ser Thr Cys Glu Phe Asp Met Pro Ala
 115 120 125

Asp Val Arg Lys Ser Glu Leu Tyr Asn Gly Ala Val Ser Asp Ala Ala
 130 135 140

Leu Tyr Cys Ile Arg Asp Val Val Glu Lys Phe Ala Arg Val Phe Val
 145 150 155 160

Pro Val Pro Leu Asp Tyr Thr Gln Ala His Val Ile Gly Arg Leu Gln
 165 170 175

Pro Asn Met Thr Gln Ala Asp Arg Thr Phe Ser Trp Tyr Asp Cys Ala
 180 185 190

Arg Phe Ile Lys Arg Cys Ile Asp Ala Ala Asp Gly Gln Pro Gly Val
 195 200 205
 Leu Ala Ser Ile Gln Gly Gly Gln Tyr Tyr Leu Tyr Asp Ala His Leu
 210 215 220
 Asp Ala Arg His Gly Thr Pro Gly Glu Ile Leu Ala Val Gln Asp Asp
 225 230 235 240
 Ala Val Leu Val Ala Ala Gly Asp Gln Ser Leu Trp Ile Gly Ser Leu
 245 250 255
 Lys Arg Lys Ala Arg Pro Gly Glu Glu Thr Phe Lys Leu Pro Ala Arg
 260 265 270
 His Val Leu Ala Glu Ala Leu Ala Asp Ile Pro Val Leu Asp Ser Ser
 275 280 285
 Ile Ala Asn Gln Met Phe Asp Glu Gln Ala Tyr Gln Pro Ile Arg Tyr
 290 295 300
 Arg Glu Ala Gly His Val Gly Glu Leu Thr Phe Glu Phe Tyr Asn Gly
 305 310 315 320
 Ala Met Ser Thr Glu Gln Cys Gln Arg Leu Val Ala Ala Leu Arg Trp
 325 330 335
 Ala Lys Thr Arg Asp Thr Gln Val Leu Val Ile Lys Gly Gly Arg Gly
 340 345 350
 Ser Phe Ser Asn Gly Val His Leu Asn Val Ile Gln Ala Ala Pro Val
 355 360 365
 Pro Gly Leu Glu Ala Trp Ala Asn Ile Gln Ala Ile Tyr Asp Val Cys
 370 375 380
 His Glu Leu Leu Thr Ala Arg Gln Leu Val Ile Ser Gly Leu Thr Gly
 385 390 395 400
 Ser Ala Gly Ala Gly Gly Val Met Leu Ala Leu Ala Ala Asp Ile Val
 405 410 415
 Leu Ala Arg Glu Ser Val Val Leu Asn Pro His Tyr Lys Thr Met Gly
 420 425 430
 Leu Tyr Gly Ser Glu Tyr Trp Thr Tyr Ser Leu Pro Arg Ala Val Gly
 435 440 445
 Ser Glu Val Ala His Gln Leu Thr Asp Ala Cys Leu Pro Ile Ser Ala
 450 455 460
 Leu Gln Ala Glu Gln Tyr Gly Leu Val Gln Gly Ile Gly Pro Arg Cys
 465 470 475 480
 Pro His Ala Phe Ser Arg Trp Leu Met Gln Gln Ala Ser Ser Ala Leu
 485 490 495

Thr Asp Glu Lys Tyr Ala Val Ala Arg Ala Arg Lys Ala Ala Leu Asp
500 505 510

Ile Asp Gln Ile Thr Arg Cys Arg Glu Ala Glu Leu Ala Gln Met Gln
515 520 525

Leu Asp Met Val His Asn Arg His Gln Phe Ala Glu Lys Cys Arg Asn
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Phe Val Leu Lys Arg Lys Thr Cys Gln Thr Pro Gln Arg Leu Met Ala
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Pro Trp Ala Val Ala Arg Glu Ala Ala Leu Val Gly
565 570

<210> 14

<211> 230

<212> PRT

<213> Pseudomonas fluorescens A2-2

<400> 14

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20 25 30

His Gln Gln Val Gln Leu Leu Val Val Leu Asp Ala Cys Ser Asp Glu
35 40 45

Thr Ala Thr Arg Val Ser Ala Met Gly Val Ala Thr Leu Glu Val Ser
50 55 60

Val Arg Asn Val Gly Lys Ala Arg Ala Leu Gly Ala Glu Arg Leu Leu
65 70 75 80

Glu Val Gly Ala Gln Trp Leu Ala Phe Thr Asp Ala Asp Thr Val Val
85 90 95

Pro Ala Asp Trp Leu Val Arg Gln Ile Gly Phe Gly Ala Asp Ala Val
100 105 110

Cys Gly Thr Val Glu Val Asp Ser Trp Ser Glu Tyr Gly Glu Ser Val
115 120 125

Arg Ser Arg Tyr Leu Glu Leu Tyr Gln Phe Thr Glu Asn His Arg His
130 135 140

Ile His Gly Ala Asn Leu Gly Leu Ser Ala Asp Ala Tyr Arg Asn Ala
145 150 155 160

Gly Gly Phe Gln His Leu Val Ala His Glu Asp Val Gln Leu Val Ala
165 170 175

Asp Leu Glu Arg Ile Gly Ala Arg Ile Val Trp Thr Ala Thr Asn Pro
180 185 190

Val Val Thr Ser Ala Arg Arg Asp Tyr Lys Cys Arg Gly Gly Phe Gly
195 200 205

Glu Tyr Leu Ala Ser Leu Val Ala Glu Gly Thr Arg Glu His Ser Pro
210 215 220

Ala His Ala Pro Ile Gly
225 230

<210> 15

<211> 348

<212> PRT

<213> *Pseudomonas fluorescens* A2-2

<400> 15

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Phe Thr Thr Pro Gly Gly Val Phe His Asp Ala Val Lys Asp Val Met
20 25 30

Gln Thr Ser Asn Met Leu Ala Asn Thr Ala Thr Thr Ile Glu Gln Ala
35 40 45

Arg Lys Leu Gly Val Lys Ile Ile His Leu Pro Ile Arg Phe Ala Asp
50 55 60

Gly Tyr Pro Glu Leu Thr Leu Arg Ser Tyr Gly Ile Leu Lys Gly Val
65 70 75 80

Ala Asp Gly Ser Ala Phe Arg Ala Gly Ser Trp Gly Ala Glu Ile Thr
85 90 95

Asp Ala Leu Lys Arg Asp Pro Thr Asp Ile Val Ile Glu Gly Lys Arg
100 105 110

Gly Leu Asp Ala Phe Ala Thr Thr Gly Leu Asp Leu Val Leu Arg Asn
115 120 125

Asn Gly Ile Gln Asn Leu Val Val Ala Gly Phe Leu Thr Asn Cys Cys
130 135 140

Val Glu Gly Thr Val Arg Ser Gly Tyr Glu Lys Gly Tyr Asp Val Val
145 150 155 160

Thr Leu Thr Asp Cys Thr Ala Thr Phe Ser Asp Glu Gln Gln Arg Ala
165 170 175

Ala Glu Gln Phe Thr Leu Pro Met Phe Phe Ala Asn Pro Ala Thr His
180 185 190

Arg Val Ser Ala Ser Thr Glu Arg Arg Ile Lys Lys Ala Ala Thr Pro
195 200 205

Ala Glu Ser Pro Leu Phe Cys Leu Gly His Ser Val Gly Ala Tyr Cys
210 215 220

Ile Ser Pro Phe Pro Asn Asp Gln Ser Ser Arg Phe Thr Ser Thr Arg
 225 230 235 240

Leu Ile His Thr Ser Ser Leu Arg Ser Pro Val Leu Ala Trp Met Pro
 245 250 255

Ser Ala Met Asn Leu Lys Ala Phe Phe Thr Ser Met Leu Arg Pro Ala
 260 265 270

Phe His Val Thr Trp Ile Asn Thr Ile Leu Gly Val Val Thr Pro Arg
 275 280 285

Tyr Pro Ala Ala Gly Thr Ser Ser Ser Leu Ala Trp Arg Leu Met Ile
 290 295 300

Trp Asn Leu Ser Cys Ser Gly Thr Leu Ala Thr Leu Val Ile Ala Ala
 305 310 315 320

Tyr Thr Thr Ser Pro Met Ala Val Ala Val Ser Val Glu Val Ser Ala
 325 330 335

Ala Arg Ser Ile Arg Thr Lys Gly Met Asp Lys Ser
 340 345

<210> 16

<211> 5

<212> PRT

<213> Unknown Organism

<220>

<223> Description of Unknown Organism: Illustrative core
 peptide

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Leu Lys Ala Gly Ala
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<210> 17

<211> 10

<212> PRT

<213> Unknown Organism

<220>

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 peptide

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<222> (4)

<223> Ser or Thr

<220>

<221> MOD_RES

<222> (7)

<223> Variable amino acid

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<210> 18
<211> 9
<212> PRT
<213> Unknown Organism

<220>
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peptide

<220>
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<400> 18
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1 5

<210> 19
<211> 5
<212> PRT
<213> Unknown Organism

<220>
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peptide

<220>
<221> MOD_RES
<222> (4)
<223> Variable amino acid

<400> 19
Leu Gly Gly Xaa Ser
1 5

<210> 20
<211> 14
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

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<222> (6)
<223> a, c, t, g, unknown or other

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<220>
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 <223> a, c, t, g, unknown or other

<400> 20
 tayggncna cnga

14

<210> 21
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 primer

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<400> 21
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20

<210> 22
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22

<210> 23
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 oligonucleotide

<400> 23
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26

<210> 24
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<223> Description of Artificial Sequence: Synthetic
 oligonucleotide

<400> 24
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23

<210> 25
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<223> Description of Artificial Sequence: Synthetic
 oligonucleotide

<400> 25
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26

<210> 26
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 <213> Unknown Organism

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<223> Description of Unknown Organism: Illustrative core
 peptide

<400> 26
 Leu Lys Ala Gly Gly Ala
 1 5

<210> 27
<211> 5
<212> PRT
<213> Unknown Organism

<220>
<223> Description of Unknown Organism: Illustrative core
peptide

<400> 27
Ser Gly Thr Thr Gly
1 5

<210> 28
<211> 7
<212> PRT
<213> Unknown Organism

<220>
<223> Description of Unknown Organism: Illustrative core
peptide

<400> 28
Gly Glu Leu Cys Ile Gly Gly
1 5

<210> 29
<211> 8
<212> PRT
<213> Unknown Organism

<220>
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peptide

<400> 29
Arg Ile Glu Leu Gly Glu Ile Glu
1 5

<210> 30
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peptide

<400> 30
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1 5

<210> 31
 <211> 578
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 <213> Myxococcus xanthus

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 20 25 30
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 35 40 45
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 50 55 60
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 65 70 75 80
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr Thr Ser Gly Ser Thr
 85 90 95
 Ala Asp Pro Lys Gly Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 100 105 110
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 115 120 125
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 130 135 140

Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
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Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
				165					170					175	
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
			180					185					190		
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
		195					200					205			
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	210					215					220				
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
225					230					235					240
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
				245					250					255	
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
			260					265					270		
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		275					280					285			
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	290						295				300				
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305					310					315					320
Xaa	Gly	Glu	Ile	Trp	Val	Arg	Gly	Pro	Ser	Val	Ala	Gln	Gly	Tyr	Xaa
				325					330					335	
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
			340					345					350		
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Leu	Arg	Thr	Gly	Asp	Leu	Xaa	Xaa	Xaa	Xaa
		355					360					365			
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	370					375					380				
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385					390					395					400
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
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450						455						460			
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465						470					475				480
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				530					535				540		
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545						550					555				560
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Ile Glu

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<213> Myxococcus xanthus

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Tyr	Xaa 275	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa 280	Xaa	Xaa	Xaa	Xaa	Xaa 285	Xaa	Xaa	Xaa
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 305 310 315 320
 Xaa Xaa Xaa Xaa Xaa Xaa Phe Arg Ile Glu Phe Glu Glu Ile Glu Xaa
 325 330 335
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 465 470 475

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      20           25           30

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
      35           40           45

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
      50           55           60

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr Thr Ser Gly
      65           70           75           80

Ser Ser Gly Arg Pro Lys Gly Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
      85           90           95

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
      115          120          125

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
      210          215          220

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
      225          230          235          240

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
      245          250          255

Xaa Xaa Xaa Xaa Gly Glu Leu Phe Ile Gly Gly Ser Gly Val Ala Arg
      260          265          270

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Gly Tyr Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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